United States Patent [19]

Winthrop

[11] **4,062,629**

[45] **Dec. 13, 1977**

[54] **PROGRESSIVE POWER OPHTHALMIC LENS HAVING A PLURALITY OF VIEWING ZONE WITH DISCONTINUOUS POWER VARIATIONS THEREBETWEEN**

[75] Inventor: **John Talley Winthrop**, Wellesley, Mass.

[73] Assignee: **American Optical Corporation**, Southbridge, Mass.

[21] Appl. No.: **638,869**

[22] Filed: **Dec. 8, 1975**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 389,043, Aug. 16, 1973, abandoned.

[51] **Int. Cl.**[2] **G02C 7/06**

[52] **U.S. Cl.** **351/169**

[58] **Field of Search** 351/168–172, 351/176, 177

[56] **References Cited**

U.S. PATENT DOCUMENTS

1,271,356	7/1918	Paige	351/171
1,351,785	9/1920	Paige	351/168
1,588,559	6/1926	Tillyer	351/176
2,869,422	1/1959	Maitenaz	351/169
2,878,721	3/1959	Kanolt	351/169
3,687,528	8/1972	Maitenaz	351/169
3,711,191	1/1973	Tagnon	351/169
3,785,724	1/1974	Maitenaz	351/169
3,910,691	10/1975	Maitenaz	351/169

Primary Examiner—David H. Rubin

Attorney, Agent, or Firm—Howard R. Berkenstock, Jr.

[57] **ABSTRACT**

A progressive power ophthalmic lens is described on which one refractive surface is formed to provide zones at the top and bottom of the refractive surface having constant dioptric focal powers. The two zones having constant dioptric focal power are of different radii of curvature such that a near viewing zone is located at the bottom and a distance viewing zone is located at the top of the refractive surface. Between these two constant dioptric focal power zones lies an intermediate zone having progressive dioptric focal power within a range centered between the dioptric focal powers of the upper and lower zones. There is a downwardly positive discontinuity in the dioptric focal power at the boundary between at least one of the constant dioptric focal power zones and the intermediate zone having progressive dioptric focal power. This power discontinuity lowers the rate of addition of dioptric focal power through the progressive power intermediate zone. This decreased rate of addition limits the amount of astigmatism and distortion which are introduced into the peripheral zones of the refractive surface. The discontinuities are rendered invisible on the surface so that a smooth surface is provided on the progressive power ophthalmic lens and the refractive surface areas near the periphery of the lens are formed from sections of a figure of revolution.

14 Claims, 26 Drawing Figures